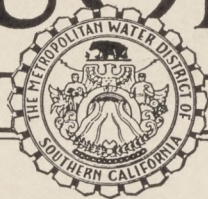


• COLORADO RIVER •
AQUEDUCT NEWS

THE METROPOLITAN WATER DISTRICT

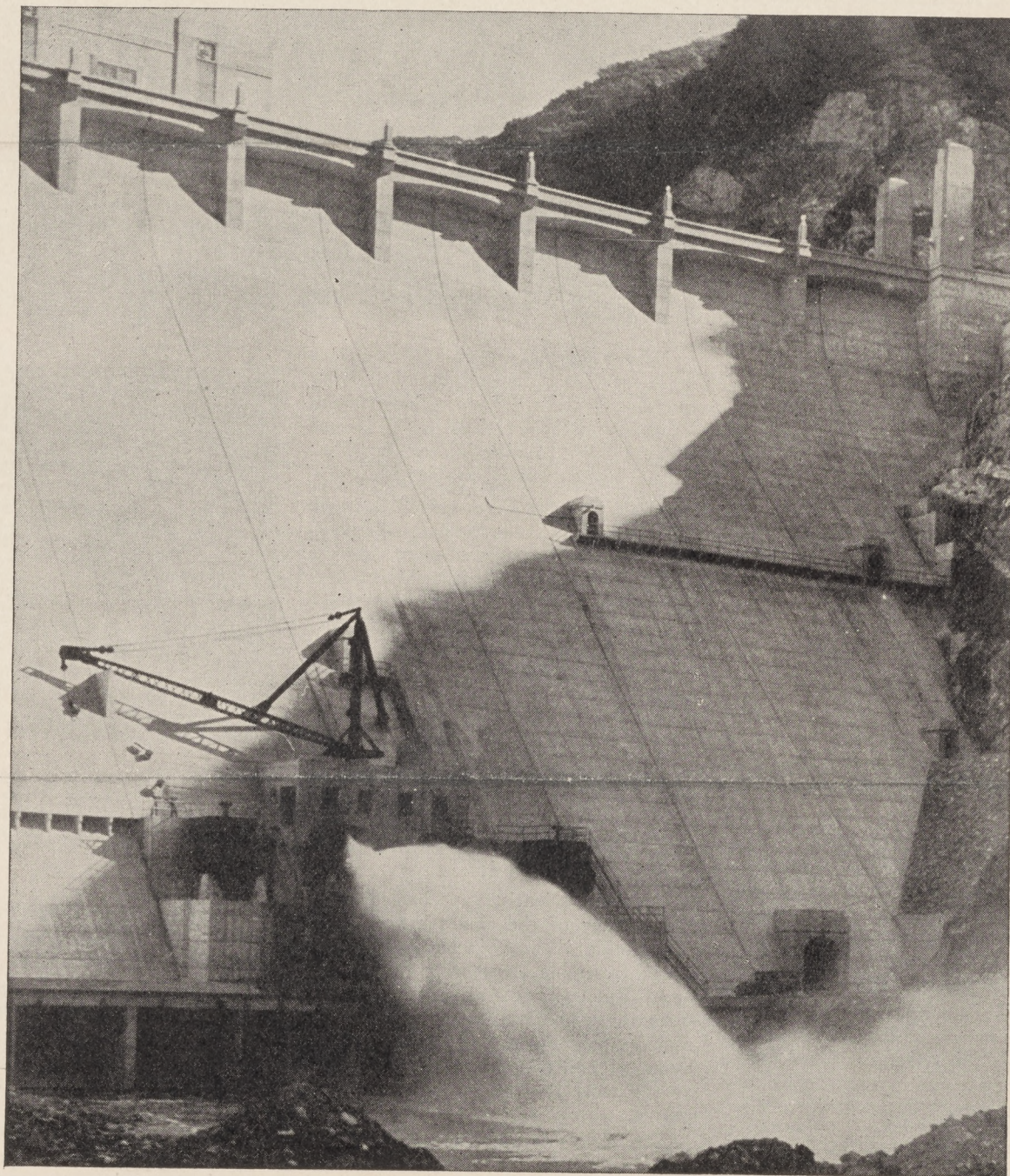


OF SOUTHERN CALIFORNIA

Vol. II

FEBRUARY 5, 1935

No. 3



LIGHTS AND SHADOWS

Newly completed Morris Dam which will form one of the important storage reservoirs on the Colorado River Aqueduct distribution system.

• COLORADO RIVER •
AQUEDUCT NEWS
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Los Angeles, California

Published twice monthly in the interest of Field and Office Workers on the Colorado River Aqueduct, and for the information of all other citizens of the Metropolitan Water District.

Vol. II February 5, 1935 No. 3

EXPERIENCE IS THE BEST TEACHER

Assuming that the second half of the winter season may yield as much rain as the first half, Southern California will record between 18 and 20 inches of precipitation for 1934-35. That there is little basis for such an assumption is made clear by an examination of rainfall records of past years.

Only once in the past 20 years has rainfall in the Los Angeles metropolitan area approached 20 inches, and that was in 1916. In one decade, from 1884 to 1893, there was an average yearly rainfall of 20.30 inches, but that was exceptional, as is shown by the fact that the average annual rainfall for the 10-year span following 1893 was 11.42 inches; and for the 20 years following 1903 the Los Angeles average was 14.50 inches. From 1924 to 1933 the average was less than eight inches.

Southern California has good reason to be elated at the start which has been made thus far this year. If the second half of the season lives up to the first half, a total rainfall of more than normal is assured. And Southern California is elated. Everywhere one hears gratification expressed.

In that very sentiment is additional evidence of the vital and pressing necessity of the Colorado River Aqueduct. The universal appreciation of our need for rainfall forcefully verifies the fundamental desert character of this country. In regions where water supply does not constitute a fundamental problem, no such interest among laymen is found. In sections where rainfall is abundant, the man on the street considers rain a necessary evil which spoils golf and picnics and cannot be avoided.

Here in Southern California, experience has taught us to be deeply thankful for rain when we are fortunate enough to have it, but never to pin our hopes on its regular arrival.

AQUEDUCT FIND AROUSES INTEREST



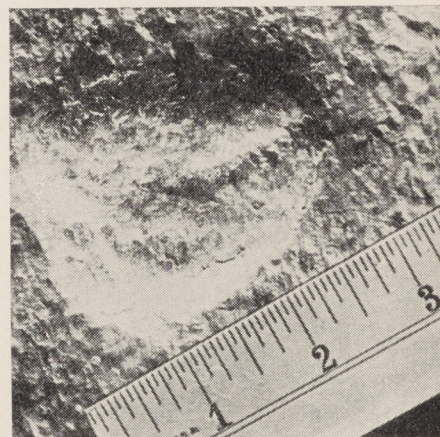
A rock slab bearing the footprints of some ancient creature, unearthed by tunnel crews of the Walsh Construction Company in the Colorado River tunnel, was the object of wide interest last week among laymen as well as scientists.

Geologists who have studied the rock fragment on which the animal's footprints are plainly marked state that the rock is at least 58 million years old. Therefore, they say, the creature which made the tracks on what was then mud-like material must have lived and walked more than 58 million years ago.

Metropolitan Water District engineers brought the geological find to the Los Angeles headquarters of the District, where it has been examined by General Manager Weymouth and members of his staff. It has been placed on public display in a window next to the District offices at 306 West Third Street.

Thus far scientists are baffled as to the identity of the creature that made the tracks. Three inches long, they closely resemble those of a present-day deer. But geologists say there probably were no such animals as the modern deer roaming about loose 58 million years ago. Some contend that the mysterious owner of the footprints was a sort of hoofed reptile.

The rock on which the footprints appear is a variety of extremely hard, red sandstone. The tracks left by the animal or reptile follow a trail that is now 250 feet beneath the earth's surface in the



General Manager Weymouth and Assistant Chief Engineer Julian Hinds examine the ancient footprints found in Colorado River tunnel. Below—close-up of one of the prints.

Copper Basin region about half a mile west of the Colorado River, near the intake of the aqueduct.

Miners were engaged in removing broken rock that had just been shattered in a tunnel blasting operation when one of the workmen caught sight of the strange footprints on a rock fragment.

Following its public showing at the District's headquarters, it is to be taken to the California Institute of Technology, where members of that institution's staff of geologists have requested that it be made available for examination.

INCREASING PROGRESS ON CANAL, CONDUIT, AND SIPHON CONSTRUCTION REPORTED BY OPEN WORK CONTRACTORS

Steadily increasing progress in the launching of another important phase of Colorado River Aqueduct construction—the building of canal, siphon, and conduit sections totaling 147 miles in length—is reported from almost a dozen points along the line of the aqueduct.

Ten construction firms hold contracts for the work, and all but two already have established camps from which to carry forward their schedules.

The camp of the Aqueduct Construction Company (formerly Hanrahan et al) is located about 16 miles northeast of Desert Center; Barrett-Hilp-Macco's about eight miles west of Freda; Jahn & Bressi's at Rice; Wood & Bevanda's about 12 miles west of Freda; Utah Construction Company's at West Iron Mountain; Three Companies' at East Eagle Mountain; Thompson-Starrett Company's about 16 miles east of Mecca, and the Griffith Company's near Lakeview.

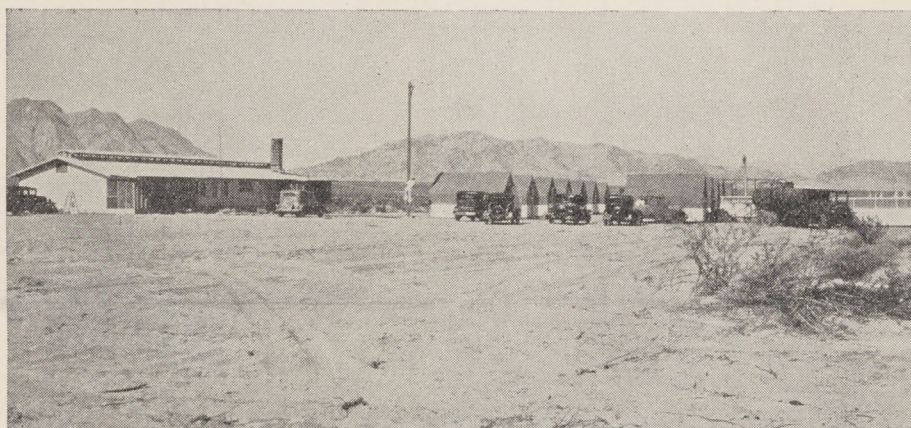
Beginning at the eastern end of the line, some of the highlights of open work construction activity are as follows:

Barrett-Hilp-Macco crews, on Schedule 3 (27,807 feet of canal), are continuing the work of excavating and filling to berm grade on the canal section with a rooter and three caterpillar-carryall units. A total of 114,000 cubic yards had been excavated up to January 26.

Spur Line

The E. M. Hawley Company, for Jahn & Bressi, has constructed a road-bed for a spur track from the main line of the Santa Fe railroad to the site of the bunkers at the Earp gravel deposit, and has excavated for footings for the bunkers. A Santa Fe crew is laying the track for the spur. Meanwhile Jahn & Bressi crews have completed 75 per cent of the common excavation on Schedule 5 (49,568 feet of canal) for a distance of 12,201 feet, making a total of 115,670 yards of excavation. Although no work was done on Schedule 5A (4,020 feet of siphon) during the week ending January 26, J. & B. crews previously had completed 90 per cent of the excavation for a distance of 310 feet, a total of 6,293 yards.

Barrett-Hilp-Macco's excavation on Schedule 7 (19,350 feet of conduit) is 75 per cent completed for a distance of 8,550 feet, a total of 162,642 yards.



Wood & Bevanda's camp, near Metropolitan Water District highway, about 12 miles west of Freda.

They are 85 per cent completed for a distance of 11,170 feet, 129,556 yards, on Schedule 7A (15,337 feet of canal).

W. & B. Progress

Progress reported from Wood & Bevanda on Schedule 8 (41,569 feet of canal) and Schedule 8A (4,930 feet of siphons) shows excavation on the former 75 per cent completed for a distance of 10,210 feet, a total of 114,225 yards. They are 85 per cent completed for 3,140 feet and 100 per cent completed for 1,330 feet in Schedule 8A (4,930 feet of siphons), a total of 94,493 yards. The placing of reinforcing steel is 23 per cent completed and the outside forms are 80 per cent completed in the 1330 feet where excavation has been finished.

Utah Construction Company crews have excavated a total of 34,363 yards on Schedule 9 (41,114 feet of canal); 1,320 cubic yards on Schedule 9B (2,620 feet of siphons); and 350 cubic yards on Schedule 9C (340 feet of siphon), making the work from 25 to 75 per cent completed.

On Schedule 10 (39,615 feet of canal) the Aqueduct Construction Company has excavated a total of 14,513 cubic yards, making excavation 75 per cent completed for a distance of 1,075 feet.

Three Companies on Schedule 12 (31,707 feet of conduit) have moved 21,460 cubic yards of earth, the material encountered being a cemented gravel, some of which was too hard to be excavated without blasting.

On Schedule 14 (30,216 feet of conduit) the Thompson-Starrett Company has excavated 22,100 yards of material. Excavation was changed from a top slice to full section on January 25. The batching plant and power lines are 90 per cent completed and the access road 33 per cent completed. A second Bucyrus Monagon dragline is being assembled on the job.

Water Line

Griffith Company crews on Schedule 23 (33,161 feet of conduit) have excavated 51,423 cubic yards of material, making this work 70 per cent completed for a distance of 2,573 feet. The construction road on the north side of the right of way has been constructed from Lakeview to the east end of Schedule 23. A 50,000 gallon water tank has been erected in Lakeview, 1,500 feet south of the right of way, and a four inch pipe line is being laid from the tank along the aqueduct for concreting water.

A summary of the schedules held by the various contractors follows:

Aqueduct Construction Company, Schedules 1-10-11-13; Barrett-Hilp-Macco, Schedules 2-3-7; Jahn & Bressi, Schedules 4-5; Wood & Bevanda, Schedules 6-8; Utah Construction Company, Schedule 9; Three Companies, Inc., Schedule 12; Thompson-Starrett Company, Schedules 14-15-16; J. F. Shea Company, Inc., Schedules 18-19-20; Morrison-Knudsen Company, Schedule 18j, and Griffith Company, Schedules 20 A, B, C, 21-22-23.

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Division 2.....W. E. Whittier
Division 3.....John Stearns
Division 4.....B. C. Leadbetter
Divisions 5 and 6.....J. B. Bond
Distribution.....R. B. Diemer

SUPERINTENDENTS

Colorado River, Copper Basin and Whipple Mt. Tunnels, Walsh Construction Co., F. T. Huntington, Gen. Supt.; W. A. Huntington and Jack Lamey, Tunnel Supts.
Coxcomb Tunnel and Iron Mt. shaft, Winston Bros., E. A. Bernard, Gen. Supt.; F. T. Hillman and R. B. Johnson, Tunnel Supts.

Iron Mt. Tunnel, West Portal, Utah Constr. Co., Ben Arp, Gen. Supt.

East Eagle Mt. Tunnel and West Eagle Mt. Tunnel, east portion, Broderick & Gordon, C. J. Kavanagh, Gen. Supt.

West Eagle Mt. Tunnel, west portion, L. E. Dixon and Bent Bros. P. C. Guinn, Gen. Supt.

Hayfield Tunnel No. 1, Hunkin & Conkey Constr. Co., G. B. Hoag, Gen. Supt.; F. Backlund, Tunnel Supt.

Hayfield Tunnel No. 2, Shofner & Gordon, H. E. Warden, Gen. Supt.

Cottonwood Tunnel, J. F. Shea Co., Inc., Gilbert Shea, Gen. Mgr.; Wallace Young, Master Mechanic.

Mecca Pass Tunnels, Morrison-Knudsen, George Fortier, Gen. Supt.

Coachella Division, R. M. Merriman, Division Supt.

Yellow Canyon Adit, E. Coachella Tunnel—District Force Account.....W. L. Taylor

Fargo Adit, East Coachella Tunnel—District Force Account.....J. H. Manwaring

Berdoo Adit, East Coachella Tunnel—District Force Account.....F. A. Weller

Pushawalla Adit, East Coachella Tunnel—District Force Account, Kenneth MacIsaac

Thousand Palms—District Force Account.....D. L. Reaburn

Wide Canyon—District Force Account.....John Jackman

Long Canyon—District Force Account.....E. E. McCabe

Little Morongo—District Force Account.....R. L. Bryant

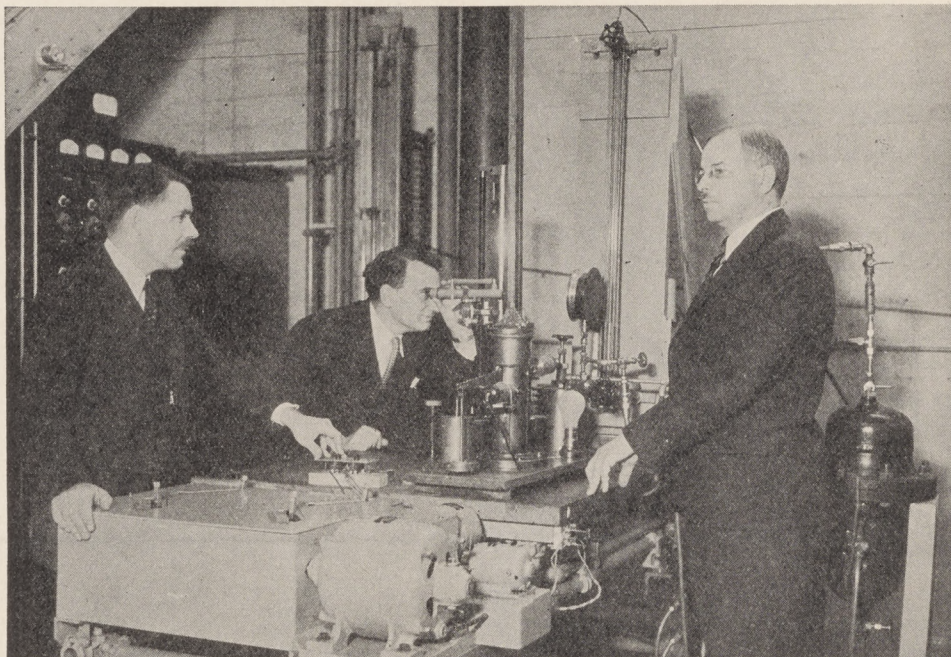
Whitewater Tunnels, West Constr. Co., H. E. Carleton, Gen. Supt.; Angus MacDonnell, Tunnel Supt.

San Jacinto Tunnel, Wenzel & Henoch, Walter Hoenecke, Gen. Supt.; W. A. Boyd, Walter Baer, and Jack May, Tunnel Supts.

(Work under this contract suspended January 15.)

Bernasconi Tunnel, Hamilton & Gleason Co., H. J. King, Gen. Supt.

Valverde Tunnel, Dravo Contr. Co., R. W. Remp, Gen. Supt.; H. C. Richardson, Asst. Gen. Supt.; Dean Luther, J. R. Glaeser, Jack Stone, and Fred Youmans, Tunnel Supts.



Left to right—Prof. R. T. Knapp, Dr. Theodor von Karman, and Prof. R. L. Daugherty at the control and instrument table in the Metropolitan Water District Pump Testing Laboratory at California Institute of Technology.

Completion Near On Whitewater Tunnels

January 27 saw the completion of the pouring of concrete arch and sidewalls in Whitewater Tunnel No. 2, according to reports from the field. The pouring of the approach cut invert and sidewalls is now being finished.

West Construction Company, contractor on the Whitewater tunnels, has sub-let the concreting to Dixon and Bent.

On January 15, West crews finished excavation of Whitewater No. 1, a 2,060 foot bore, and work is now in progress on a road across the canyon for the transportation of aggregate and materials to the tunnel, where concreting is scheduled to begin soon.

The two tunnels will be connected by a siphon under Whitewater Wash, to be constructed by the J. F. Shea Company, builder of the Cottonwood tunnel on the aqueduct.

West Executive Here

D. R. Rankin, vice-president of the West Construction Company, has established his residence in Monrovia in preparation for the launching of work by his firm on Monrovia Tunnels 1, 2 and 3 on the aqueduct distribution system.

Pump Testing Goes Forward At Caltech

Far from hammering drills, booming explosives, and clattering shovels, an important phase of Colorado River Aqueduct work continues to go forward within the cloistered halls of California Institute of Technology at Pasadena.

It is the work being done by the Metropolitan Water District Pump Testing Laboratory where problems in connection with lifting Colorado River water a total of 1,600 feet along the aqueduct are being studied.

Prof. R. T. Knapp, Dr. Theodor von Karman, and Prof. R. L. Daugherty, of the Institute staff, are working on these problems with Chief Electrical Engineer James M. Gaylord and Mechanical Engineer R. M. Peabody of the District.

The importance of the work being done may be appreciated from the fact that it is estimated that with all the aqueduct pumps in operation a variation of one per cent in their efficiency will cause a variation in the cost of electric energy of \$50,000.

The present laboratory program involves a series of tests of eight-inch centrifugal pumps under various operating conditions; at various suction and discharge heads. The latter range up to about 500 feet. Good results are being obtained.

Safety on the Aqueduct

Splendid work in protecting employees from injury is being carried on by the contractors and the District on tunnel driving and lining operations, canal and conduit construction, at aggregate and batching plants, and on other features of the project, according to Safety Engineer Osgood who has recently completed a periodic trip over the 240 miles of aqueduct construction.

He cited ever increasing activity in construction operations, and a marked development of the Safety Spirit among the supervisors and men. This, he stated, is reflected in the rapidly decreasing accident frequency which, since the beginning of construction, reached the lowest point during the month of December, 1934.

Mr. Osgood's compilation of the year's achievements includes the following:

Copper Basin tunnel, Walsh Construction Company—one no-lost-time accident month.

East Iron Mountain tunnel, Winston Brothers—won the Division Hard Hat Safety Trophy for April, May and June.

Coxcomb tunnel, Winston Brothers—two no-lost-time accident months; won Division 3 Hard Hat Safety Trophy for January, February, March, July, September, October, November, and December.

East Eagle Mountain tunnel, Broderick & Gordon—one no-lost-time accident month.

East Portion West Eagle Mountain tunnel, L. E. Dixon and Bent Brothers—one no-lost-time accident month; won Division 3 Hard Hat Safety Trophy for August.

Hayfield Tunnel No. 2, Shofner & Gordon—seven no-lost-time accident months; lowest lost-time accident frequency (49.) for year in the 29 aqueduct camps—awarded Safety Banner.

East Cottonwood tunnel, J. F. Shea Company—one no-lost-time accident month.

West Cottonwood tunnel, J. F. Shea Company—one no-lost-time accident month.

Whitewater tunnel, West Construction Company—one no-lost-time accident month.

Cabazon Shaft, *San Jacinto tunnel*, Wenzel and Henoch—first-aid team won the gold trophy and a loving cup at American Red Cross First-Aid Contest.



A portion of the group at the Coachella Safety Rally, January 16.

Congratulations are very much in order these days out at Shofner & Gordon's Hayfield No. 2 camp, which rounded out the year of 1934 with a lost-time accident frequency of 49., the lowest in the 29 aqueduct camps.

Superintendent Warden and his men have been awarded the Safety Banner which is to be presented each year by Safety Engineer Osgood to the job making the best record.

Hayfield No. 2's splendid record includes seven no-lost-time accident months during the year.

Another sterling record for the year was made by the District's Little Morongo Camp. Under Superintendent Bryant the Morongans turned in the lowest lost-time accident frequency (55.) of the eight Coachella camps, with five no-lost-time accident months, and the lowest accident costs for the year.

Potrero Shaft, *San Jacinto tunnel*, Wenzel and Henoch—two no-lost-time accident months.

West Portal San Jacinto tunnel, Wenzel and Henoch—one no-lost-time accident month; first-aid team won first place in Mining Division and was

awarded a loving cup at the California First-Aid Contest.

Bernasconi tunnel, Hamilton and Gleason—one no-lost-time accident month.

Valverde tunnel, Shaft No. 4, Dravo Contracting Company—two no-lost-time accident months.

Yellow Canyon, District Force Account—won Safety Flag for January; one no-lost-time accident month.

Fargo Canyon, District Force Account—won Safety Flag for February and May.

Berdoo Canyon, District Force Account—won Safety Flag for October; one no-lost-time accident month.

Thousand Palms tunnel, District Force Account—won Safety Flag for April and July; 100% First-Aid training.

Wide Canyon tunnel, District Force Account—won Safety Flag for March; two no-lost-time accident months; 100% First-Aid training.

Long Canyon tunnel, District Force Account—won Safety Flag for June; two no-lost-time accident months; 100% First-Aid training.

(Continued on Page 8)

**BEST PROGRESS
This Period**

6 day week: 7 Palms West, 942 ft.
7 day week: Whipple Mt. West, 788 ft.

TUNNEL PROGRESS

Jan. 1 to 31, 1935

Tunnel Excavated to Date, 60.08 Miles

**BEST WEEK'S PROGRESS
This Year**

6 day week: 7 Palms West, 225 ft.
7 day week: Whipple Mt. East, 212 ft.

TUNNELS ON CONTRACT	Length in feet	Number of Shifts	EXCAVATION PROGRESS IN FEET		
			Average Per Shift	This Period	Total to date
Walsh Constr. Co. COLORADO RIVER West Portal	(5482) 5482			0	5482
COPPER BASIN, No. 1 West Portal	(752) 752			0	752
COPPER BASIN, No. 2 East from adit	(11,568) 1878			0	1878
Adit	330			0	330
West from adit	9690			0	9690
WHIPPLE MT. East from adit	(32,265) 18,352	93	7.6	705	9302
Adit	924			0	924
West from adit	13,913	93	8.5	788	7752
Winston Bros. IRON MT. East from shaft	(39,759) 9844	80	6.1	489	4509
Shaft	165			0	165
West from shaft	13,743	80	9.3	747	8695
Utah Constr. Co. IRON MT. West Portal	16,172	89	8.0	713	11,508
Winston Bros. COXCOMB East Portal	(17,795) 17,795	83	8.9	741	9972
Broderick & Gordon EAST EAGLE MT. West Portal	(9,442) 9442	81	7.2	580	3289
WEST EAGLE MT. East from adit	(26,494) 7871	81	8.3	670	5455
Adit	2008			0	2008
West from adit	7974	81	7.6	616	4906
Dixon & Bent WEST EAGLE MT. West Portal	10,649	81	5.6	453	8432
Hunkin & Conkey HAYFIELD, No. 1 East from adit	(9713) 5317	87	5.4	472	4736
Adit	511			0	511
West from adit	4396	59	6.8	401	4396
Shofner & Gordon HAYFIELD, No. 2 West Portal	(5435) 5435	54	9.0	486	5363
J. F. Shea Co. COTTONWOOD East Portal	(20,105) 10,118			0	10,118
West Portal	9987			0	9987
Morrison-Knudsen MECCA PASS No. 1, West Portal	(5,940) 338				
No. 2, West Portal	997				
No. 3, East Portal	4605				
West Constr. Co. WHITEWATER No. 1, West Portal	(10,232) 2060	36	10.0	360	2060
No. 2, East Portal	8172				
Arch Concrete	8172 ft.				
Wenzel & Henoch SAN JACINTO East from Cabazon	(67,415) 8553	93	0.9	80	1793
Cabazon shaft	246			0	246
Cross drift	935			0	935
West from Cabazon	22,839	93	0	0	4874
East from Potrero	20,589	90	0	0	160
Potrero shaft	796			0	796
West from Potrero	6712	92	5.8	538	985
West Portal	8722	93	4.5	414	4528
Hamilton & Gleason BERNASCONI East Portal	(6220) 6220	53	3.7	194	5998
Dravo Contr. Co. VALVERDE East from Shaft 1	(38,765) 2140				
Shaft 1	64			0	64
West from Shaft 1	1525			0	2265
East from Shaft 2	5400			0	4660
Shaft 2	204			0	204
West from Shaft 2	5400	87	4.5	396	6702
East from Shaft 3	6950	87	5.2	453	3875
Shaft 3	192			0	192
West from Shaft 3	6950	87	3.4	299	5926
East from Adit	5117	87	3.4	298	640
Adit	391			0	391
West from Adit	5283	87	1.6	141	472
Total Excav. Contract Tunnels exclusive of Adits and Shafts (In Miles)	307,382 58.22	2027	5.4	11,034 2.09	187,412 35.49

TUNNELS ON FORCE ACCOUNT

TUNNELS ON CONTRACT	Length in feet	Number of Shifts	EXCAVATION PROGRESS IN FEET		
			Average Per Shift	This Period	Total to date
EAST COACHELLA TUNNEL Yellow Canyon Adit	(96,605) 686			0	686
East from adit	10,204	72	8.8	632	10,204
West from adit	10,076	81	9.1	739	10,688
Fargo Canyon Adit	891			0	891
East from adit	11,850	81	8.3	670	9327
West from adit	15,200	81	9.2	746	7754
Berdoo Canyon Adit	2042			0	2042
East from adit	15,824	81	8.1	660	10,251
West from adit	12,456	81	9.3	750	10,762
Pushawalla Canyon Adit	2935			0	2935
East from adit	10,186	81	9.9	798	8497
West from adit	10,809	81	6.7	541	8256
WEST COACHELLA TUNNELS	(81,454)				
THOUSAND PALMS No. 1, West Portal	5				
No. 2, Tunnel	5				
WIDE CANYON No. 1, E. Portal	Sched. 5				
No. 1, W. Portal	6				
No. 2 Tunnel	8				
SEVEN PALMS E. Portal	(16,730) 8390				
W. Portal	8340	81	11.6	942	4810
LONG CANYON E. Portal	(15,295) 8360				
W. Portal	6935	81	10.7	867	6216
BLIND CANYON E. Portal	(6848) —				
W. Portal	6848	81	8.3	669	0
MORONGO No. 1 E. Portal	(5712) 5712				
W. Portal	—	81	8.9	719	5087
MORONGO No. 2 E. Portal	(1820) 1820				
W. Portal	—				0
Total excav. Force Acct. Tunnels excl. of Adits and Shafts (In Miles)	178,059 33.72	1206	8.4	10,086 1.91	129,812 24.59
Total Tunnel Excavation (Miles)	91.94		6.5 ft.	4.00	60.08

Heading excavation is counted as two-thirds of full tunnel excavation. Adits and Shafts progress is not included in total footage.